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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/821,753	03/30/2001	Tuqiang Ni	2328-053	5171

7590

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/821,753

Applicant(s)

NI ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-14, 16-18, 20-28, 30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) 14, 16, 24 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, 17-18, 20-23, 25-26, 28, and 30-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

It should be noted that claim 24 depends on non-elected claim 14. Furthermore, claim 27 depends on claim 24. Therefore, claims 24 and 27 have been withdrawn from further consideration. Please note that the status identifiers for both claims are incorrect and they must be corrected in the response to this office action.

### ***Specification***

The amendment filed 8/5/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the power is in a steady state function subsequent to power start up and prior to the beginning of power shut down.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-6, 8-13, 17-18, 20-23, 25-26, 28 and 30-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

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The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification, as originally filed, fails to provide support for the limitation of gradually changing the amount of AC power supplied to the plasma during processing of the workpiece "while the power is in a steady state condition subsequent to power start up and prior to the beginning of power shut down".

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 8-13, 17-18, 20-23, 25-26, 28, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhardwaj et al., U.S. Patent 6,051,503 in view of Howald et al., WO 00/58992.

Bhardwaj et al. shows the process substantially as claimed including forming a feature of a trench through plasma etching where the RF power (for example, platen power, see fig. 15) is continuously applied to the workpiece while the feature is being formed and is gradually changed and the flow rate and the species are not changed in order to form a feature with a gradual transition in the shape of the material, the gradual power change occurring during the gradual transition in the shape of the material, where the vacuum chamber is subject to operating at different pressures and the gas species are subject to flowing at different flow rates while the workpiece is being processed (see abstract, col. 6-lines 43-49, col. 8-line 57 to col. 9-line 26, and figs. 19A-19B).

Bhardwaj et al. fails to expressly disclose: wherein the gradual change is pre-programmed, and wherein the electrode is responsive to an AC power source that is supplied by a coil coupling an RF plasma excitation field to the chamber. Howald et al. discloses a method of processing by etching (see page 1-lines 15-19) a workpiece in a vacuum plasma processor chamber including computers 20 and 34 and wherein a gas species is converted into an AC plasma (see page 6-lines 17-20). Note also that the AC power is supplied by an electrode 56 being on a holder for the workpiece and the electrode is responsive to an AC power source that is supplied by a coil 48 coupling an RF plasma excitation field to the chamber. In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify

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the process of Bhardwaj et al. so as to include a process using the apparatus of Howald et al. because such an apparatus allows for a high level of control over the plasma process being performed. Moreover, with respect to the changes in power being pre-programmed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to pre-program the power change into the microprocessors 20,34 of Howald et al. because in such a way operator error will be eliminated.

Moreover, merely using a computer to automate a known process does not by itself impart nonobviousness to the invention. See *Dann v. Johnston*, 425 U.S. 219, 227-30, 189 USPQ 257, 261 (1976); *In re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958).

With respect to the specific time period to which the power remains at constant wattage and the amount the power is changed, it would have been obvious to determine through routine experimentation the optimum amount of time at which the power should remain constant and the optimum amount the power is changed, to achieve the desired rounded profile of the trench and would not lend patentability to the instant application absent the showing of unexpected results.

### ***Response to Arguments***

Applicant's arguments filed 8/5/04 have been fully considered but they are not persuasive. Applicant argues that the rejection under 35 USC 112, first paragraph, is improper because support is provided for "gradually changing on a pre-programmed basis, the amount of AC power supplied to the plasma during processing of the

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workpiece while the power is in a steady state condition subsequent to power start up and prior to the beginning of power shut down". The examiner respectfully disagrees, however, because it is not sufficiently explained how the figures provide support for gradually changing the amount of AC power supplied to the plasma during processing of the workpiece while the power is in a steady state condition subsequent to power start up and prior to the beginning of power shut down. Furthermore, and for the same reasons, the amendment to the specification is also objected to under 35 USC 132. The declaration of Ni fails to provide convincing evidence that the use of the steady state language in both the present claims and the amendment to the specification was inherent from the original disclosure.

Furthermore, the amendments to the claims do not overcome the previous rejections since the use of the word feature, as broadly interpreted, can either include the entire trench or just a portion of the trench which is rounded.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro  
Primary Examiner  
Art Unit 1763

October 17, 2004